



GEM
Gas Energy Mixing By CWT

CASE STUDY

FROZEN FOODS

INTRODUCTION

Clean Water Technology Inc. (CWT), the creator of the Gas Energy Mixing (GEM) System, offers the most advanced primary treatment system on the market. The GEM System provides superior reduction of total suspended solids (TSS), biological and chemical oxygen demand (BOD/COD), fats, oils and grease (FOG) and turbidity and at the same time provides complete expandability in terms of flow and the level of contaminant loadings.

CHALLENGE

A growing frozen food company was discharging 25,000 gpd of processing and wash down water directly to an underground three stage clarifier. The city was increasing their surcharges for TSS, BOD/COD and fines for pH excursions and FOG violations were becoming routine. Production demands prevented a complete redesign of the piping system and the space for a treatment system was limited to a total of 2.5 parking spaces above the underground clarifier in the parking lot. The proposed system needed to reduce TSS, FOG and BOD/COD while handling varying flow rates.

TESTING AND DEMONSTRATION

CWT engineers visited the site and drew 24 hour composite samples for laboratory testing and to confirm the performance of the GEM System in this application. The results met all of the discharge limits. CWT engineers presented additional benefits including a reduced footprint, lower operating costs, higher output consistency, drier sludge, faster response times, adjustability within seconds to changing waste stream conditions, flow expansion capabilities without adding to the footprint and faster and less expensive installation compared to traditional DAF designs.



SOLUTION

CWT engineers developed a process diagram, estimated operating costs and submitted a proposed layout for addressing the pretreatment requirements. This plan proposed an Equalization tank prior to the GEM System 20/75 that would address flow volume spikes and allow for neutralization in a bypass configuration. Using the first stage of the existing clarifier as a pump lift station, the effluent was pumped to a side hill screen for coarse solids removal mounted on a steel mezzanine above the treatment area. Wastewater then flowed by gravity to the EQ tank where mixing and neutralization occurred. Dual feed pumps feed wastewater to the GEM System. Chemical injection of polymer and flocculant came from mixing tanks directly to the Liquid Solid Gas Mixing (LSGM) heads. Polymers were injected into the water at various pressures prior to each head where the centrifugal force created in the LSMG heads uncoiled the polymer offering more surface area to the waste particles. Simultaneously, the system is pressurized as it saturates 100% of the waste stream with air. This pressure makes the chemical mixing very efficient, reducing chemical usage. When the floc enters the flotation cell at atmospheric pressure, the entrained air expands inside the floc pushing out excess water and forming a drier sludge. It is very efficient since solid liquid separation occurs in the LSMG heads with the simultaneous growth of large porous flocs and bubbles. The effluent discharge has a high DO or dissolved oxygen level for enhancing the biological digestion of remaining contaminants and reducing odors.



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TABLE 1: GEM Effectiveness on Influent from this food processor

PARAMETER	INFLUENT	EFFLUENT	PERCENT REDUCTION
TSS	2,000 ppm	30 ppm	99%
COD	5,000 ppm	1,500 ppm	70%
TURBIDITY	Over 1,000 NTU	8 NTU	99%
FOG	Over 1,000 ppm	15 ppm	99%

ECONOMICS

Operations: A control panel shows status and provides alarms to initiate operator actions. The original clarifier no longer needs weekly pumping and odors are reduced significantly. Pretreatment was feared to be prohibitively expensive yet chemical consumption is very reasonable because of the efficiencies of the GEM System.

Pretreatment: Due to the highly efficient removal of contaminants by the GEM system the COD was reduced by 70% and TSS was reduced by 94%. Drain lines in the building were not touched and production was not disrupted during the installation. The entire treatment area was confined to the 2.5 parking spaces above the existing clarifier. **Surcharges:** The client surcharges have gone down by 45%, to a manageable level. In addition the client does not need to buy new units of wastewater permits to continue discharging its wastewater.

Sustainability: With the GEM System, the client has able to eliminate a serious problem with the city. By lowering the discharge surcharges and fines, the future expansion of the company in the current building was possible. The GEM System offered the ability to adapt to future growth by increasing the flow volumes as needed without changing the footprint of the waste treatment system. In addition, other savings related to the advanced efficiencies of the GEM System were seen including reduced chemical usage, the ability to utilize higher grade chemicals and reduced sludge costs (storage, hauling and disposal) compared to traditional DAF technologies.

EXPERIENCE

CWT's successful implementation of the wastewater treatment solution for this Client resulted not only from the innovative design of the GEM System but from CWT's experienced engineers with many proven installations in a variety of industries worldwide including bakeries, frozen foods, canneries, dairies, tanneries, rendering, laundries, cosmetics, condiments, dressings, seafood and various juices, drinks and concentrates. References for your specific application are available upon request.

Being only as good as our last project requires 100% commitment to the success of each and every project.

